

## THE CLAIMS

- 1 1. A method of routing packets within a communication system, comprising the steps of:
  - 2 receiving a packet from a communications network;
  - 3 allocating a message block header within said received packet;
  - 4 associating a predefined default value for said message block header;
  - 5 identifying a quality-of-service value associated with said received packet;
    - 6 metering the received packet to determine whether resources are available to properly route the packet while complying with a service level agreement associated with said classified quality-of-service;
    - 7
    - 8 in response to a determination that said packet cannot be routed in compliance with said service level agreement, dropping said packet; otherwise, routing said packet
    - 9
- 1 2. The method of claim 1 further comprising the steps of:
  - 2 determining whether said identified quality-of-service value is different than said associated predefined default value for said message block header; and
  - 3
  - 4 in response to said determination, overwriting said message block header with said identified quality-of-service value.
  - 5
- 1 3. The method of Claim 1 wherein said step of routing said packet further comprises the steps of:
  - 2 determining whether an outgoing device driver is available for said quality-of-service value; and
  - 3
  - 4 in response to a determination that said outgoing device driver is unavailable, queuing said packet within one of a plurality of primary queues associated with said identified quality-of-service value.

- 1    4.     The method of Claim 3 wherein said step of queuing said packet further comprises the steps of:  
2                 assigning a predefined threshold value with each of said plurality of primary queues;  
3                 monitoring each of said plurality of primary queues to determine whether the capacity level  
4     associated with said queue exceeds said predefined threshold value; and  
5                 queuing any additional packets, in response to said determination, to one of a plurality of  
6     secondary queues associated with said identified quality-of-service value.
- 1    5.     The method of Claim 4 wherein certain of said plurality of secondary queues are assigned to one  
2     of said plurality of primary queues.
- 1    6.     The method of Claim 5 wherein one of said plurality of secondary queues is an expedited  
2     forwarding queue, further comprising the steps of queuing said packet identified as expedited  
3     forwarding value within said expedited forwarding queue.
- 1    7.     The method of claim 3 wherein said plurality of primary queues comprises:  
2                 a high priority egress queue;  
3                 a medium priority egress queue; and  
4                 a low priority egress queue.
- 1    8.     The method of Claim 1 wherein packets identified with particular one of said quality-of-service  
2     value is guaranteed a predefined bandwidth within said communication system.

- 1        9. A packet router within a packet communication network for providing differentiated services  
2           based on a service level agreement associated with a plurality of incoming packets to be  
3           processed and routed within said packet router, comprising:  
  
4              a ingress driver for receiving said plurality of incoming packets;  
  
5              a classifier coupled to said ingress driver for classifying each of said plurality of packets with a  
6              particular behavior aggregate value wherein said behavior aggregate value is indicative of the internal  
7              routing treatment to be provided by said packet router for said each packet;  
  
8              a meter coupled to said classifier for evaluating some of said plurality of packets and discarding  
9              certain ones of said packets wherein the service level agreement associated with said identified behavior  
10             aggregate value cannot be guaranteed;  
  
11             a differentiated queuing block coupled to said meter and said classifier for handling said plurality  
12             of packets; and  
  
13             a egress driver coupled to said differentiated queuing block for transmitting some of said plurality  
14             of packets over said packet communications network.
  
- 1        10. The packet router of Claim 9 wherein said ingress driver further comprises means for allocating a  
2              message block header for each of said packets for storing said behavior aggregate value.  
  
1        11. The packet router of Claim 10 wherein said egress driver comprises means for stripping said  
2              message block header within each of said packets before transmitting each of said packet over  
3              said communications network.  
  
1        12. The packet router of Claim 10 wherein said classifier further comprises a table for mapping a  
2              differentiated services code point (DSCP) stored within each of said packets to an associated  
3              behavior aggregate value and means for storing said behavior aggregate value within said  
4              message block header.

- 1    13. The packet router of Claim 9 wherein said classifier further comprises a filter for determining  
2       whether particular ones of said plurality of packets need to be evaluated by said meter and  
3       forwarding such determined packets to said meter.
- 1    14. The packet router of Claim 9 wherein said differentiated queuing block further comprises a  
2       plurality of primary queues for queuing some of said packets when resources within said egress  
3       driver are not available.
- 1    15. The packet router of Claim 14 wherein some of said packets are classified as expedited  
2       forwarding, assured forwarding or best efforts forwarding and wherein said plurality of primary  
3       queues further comprises:
- 4                  a high priority egress queue for queuing packets that are classified expedited forwarding;  
5                  a medium priority egress queue for queuing packets that are classified assured forwarding; and  
6                  a low priority egress queue for queuing packets that are classified best effort forwarding.
- 1    16. The packet router of Claim 15 wherein said differentiated queuing block further comprises a  
2       plurality of secondary queues for queuing some of said packets when certain one of said primary  
3       queues exceeds a predefined threshold content value.
- 1    17. The packet router of Claim 16 wherein said plurality of secondary queues further comprises:  
2                  an expedite forwarding queue for queuing packets that are classified expedited forwarding;  
3                  an assured forwarding queue for queuing packets that are classified assured forwarding; and  
4                  a best effort queue for queuing packets that are classified best efforts forwarding.
- 1    18. The packet router of Claim 17 wherein each of said secondary queues further comprises a token  
2       bucket meter for keeping track of the bandwidth rate available for said associated behavior  
3       aggregate value.



- 1        21. The apparatus of Claim 20 wherein said means for queuing further comprises:
- 2              a plurality of secondary queues;
- 3              means for assigning a predefined threshold value with each of said plurality of primary queues;
- 4              means for monitoring each of said plurality of primary queues to determine whether the capacity
- 5              level associated with said queue exceeds said predefined threshold value; and
- 6              means for queuing any additional packets, in response to said determination, to one of said
- 7              plurality of secondary queues.
- 1        22. The apparatus of Claim 21 wherein certain of said plurality of secondary queues are assigned to
- 2              particular one of said plurality of primary queues.
- 1        23. The apparatus of Claim 21 wherein said plurality of secondary queues comprises:
- 2              an expedited forwarding queue;
- 3              an assured forwarding queue; and
- 4              a best effort queue.
- 1        24. The apparatus of Claim 20 wherein said plurality of primary queues further comprises:
- 2              a high priority egress queue;
- 3              a medium priority egress queue; and
- 4              a low priority egress queue.